



Incidental bladder wall alteration as a surgical complication risk factor in Indonesian benign prostate hyperplasia patient

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ABSTRACT

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Bladder obstruction due to benign prostatic hyperplasia (BPH) causes bladder walls alteration such as trabecular and diverticula. Although it is asymptomatic, however it affects the surgery complication. The aim of this study was to evaluate the correlation between bladder wall alteration and post-surgery complications in BPH patients. It was a descriptive observational study with cross-sectional design involving BPH patients who underwent histopathological examination and surgical intervention in the Bhayangkara Hospital Mataram from January 2010-December 2014. Data of the patients including age, place of birth, intraoperative finding, comorbid condition, and post-surgery complication were obtained from the medical record. The relationship between variables was analyzed using Pearson correlation test and linear regression test. A total 114 subjects were involved in this study with the most common age was in the range 60-69 years (43.0%). Seventy-five subjects (74.3%) had trans urethra resection of prostate (TURP). Trabecula (28.7%), diverticula (4.0%), and bladder stone (10.9%) were found when the surgical intervention performed. The most common post-surgical complication was chip or clot retention (56.4%). Significantly relationship between intraoperative finding with post-surgical complication was observed ($r = 0.265$; $R^2 = 0.07$; $p < 0.05$). In conclusion, there is correlation between bladder wall alteration and post-surgical complication in BPH patients. Early bladder wall alteration screening is suggested in BPH patients before surgical intervention performed.

ABSTRAK

Penyumbatan kandung kemih akibat pembesaran prosta jinak (BPJ) dapat menyebabkan perubahan pada struktur dinding kandung kemih, seperti trabekula dan divertikula. Meskipun tidak bergejala, perubahan ini berpengaruh terhadap komplikasi paska bedah prostat. Penelitian ini bertujuan untuk mengetahui korelasi antara perubahan dinding kandung kemih terhadap komplikasi paska bedah pada penderita pembesaran prostat jinak. Tujuan penelitian ini adalah mengkaji hubungan antara perubahan struktur dinding kandung kemih dan komplikasi paska bedah. Penelitian observasi deskriptif dengan rancangan potong lintang ini melibatkan pasien BPJ yang menjalani pemeriksaan histopatologi dan pembedahan di Rumah Sakit Bhayangkara, Mataram dari Januari 2010-Desember 2014. Data pasien yang meliputi umur, tempat lahir, penemuan selama pembedahan, kondisi komorbid, komplikasi paska bedah diperoleh dari data rekam medis. Hubungan antar variable dianalisis dengan uji korelasi Pearson dan regresi linier. Total sebanyak 114 subjek dilibatkan dalam penelitian, umur pasien sebagian besar antara 60-69 tahun (43,0%). Tujuh puluh lima (74,3%) menjalani resect prostate trans uretra (RPTU). Taberkula (28,7%), divertikula (4%), batu kandung kemih (10,9%) ditemukan selama pembedahan dilakukan. Komplikasi paska bedah paling sering dijumpai adalah retensi akibat pembekuan darah atau jaringan prostat (56,4%). Terdapat hubungan antara perubahan dinding kandung kemih dan komplikasi paska bedah ($r = 0,265$; $R^2 = 0,07$; $p < 0,05$). Dapat disimpulkan, ada hubungan antara perubahan dinding kandung kemih dan komplikasi paska bedah pada pasien BPJ. Penapisan dini terhadap perubahan dinding kandung kemih disarankan pada pasien BPJ sebelum dilakukan pembedahan.

Keywords:

benign prostate hyperplasia;
bladder wall alteration;
complication;
comorbid;
trans urethra resection of prostate;

INTRODUCTION

The bladder outlet obstruction (BOO) incidence has been increasing in line with the age. Benign prostate hyperplasia (BPH) is the main cause of BOO in men.¹ The symptoms of BPH is commonly associated with lower urinary tracts symptom (LUTS), such as urinary retention. Severe or prolonged urinary retention will lead to bladder wall weakness, which the main cause is changing in the detrusor structure.^{2,3} The detrusor thickening, which called as trabecula, will affect bladder function. The higher intravesical pressure makes bladder wall weaker and lead to sac formation called diverticula.⁴ Trabecula and diverticula are often found incidentally because they are commonly asymptomatic.⁵ Trabecula and diverticula are associated with recurrent urinary tract infection, bladder stone that trapped in the sac, and neoplastic process.²⁻⁶ Trabecula and diverticula can cause a serious problem in the BPH treatment.

This study was aimed to evaluate the correlation between bladder wall alteration and post-surgery complications in BPH patients. Trabecula, diverticula and bladder stone were used to describe the bladder wall alteration. The result of the study could be used early screening before surgical intervention performed.

MATERIALS AND METHODS

Subjects and design

It was a descriptive observational study with cross-sectional design conducted in July 2015 in the Bhayangkara Hospital Mataram, West Nusa Tenggara. The BPH patients who visited the hospital due to lower urinary tract symptoms (LUTS) and underwent histopathological examination as well as surgical intervention from January 2010-December 2014 were involved in

this study. The inclusion criteria were BPH patients proven by histopathologic biopsy and treated with surgical treatment such as trans urethral resection of the prostate (TURP) or open prostatectomy. Carcinoma proven by histopathology biopsy was excluded.

Procedure

Data were retrieved from medical record, including 1) age, defined by the age when the patient visiting the hospital; 2) surgical technique, defined by TURP or open prostatectomy; 3) post-surgery complications, defined by the complication that occurred post TURP or open prostatectomy such as bleeding, clot retention, urinary incontinence, urinary tract infection, or TURP syndrome; 4) comorbid factor, defined by comorbid factor that showed in Charlson index; and 5) intraoperative finding, defined by anomalous that found in the bladder, such as trabecula, diverticula, or bladder stone when a TURP or open prostatectomy was performed.

Statistical analysis

Descriptive statistics were used to characterize all variables. The relationship between intraoperative finding with post-surgery complication was analyzed with Pearson correlation test and linear regression test. A p value < 0.05 was considered statistically significant.

RESULTS

A total 114 patients were involved in this study. The most common age was in the range 60-69 years ($n=41$ or 43%). The most common surgical technique was TURP ($n=75$ or 74.3%). All of the variable characteristics are presented in TABLE 1. Trabecula (28.7%), diverticula (4%), and bladder stone (10.9%) were found when the surgery had performed.

TABLE 1. Subject's characteristics

Variable	n	%
Age (years)		
• 60-69	41	43
• 50-59	25	26
• 70-79	19	20
• 80-89	8	8
Charlson Index		
Diabetes Mellitus	5	4.3
Surgery technique		
TURP	75	74.3
Open prostatectomy	8	7.9
TURP: trans urethra resection of prostate		

Post-surgery complications were found in the study. The most common post-surgery complications was chip or clot retention (n=57 or 56.4%). The other

complications are presented in TABLE2. There was a relationship between intraoperative finding and post-surgery complication ($r=0.265$; $R^2 = 0.07$; $p < 0.05$).

TABLE 2. Post-surgery complication characteristics

Complication	n	%
Chip or clot retention	57	56.4
Bleeding	1	1
Urinary tract infection	2	2
TURP Syndrome	6	5.9
TURP: trans urethra resection of prostate		

The relationship between age, comorbid factor, intraoperative finding and post-surgery complication are presented in TABLE3.

TABLE3. The relationship between age, intraoperative finding, comorbid factors, and post-surgery complications

Variable	r	R ²	p
Intraoperative finding and post-surgery complication	0.265	0.07	< 0.05
Age and post-surgery complication	0.145	0.21	0.147
Intraoperative finding and age	-0.37	0.001	0.712
Age and comorbid factor	0.08	0.000	0.846
Post-surgery complication and comorbid factor	0.168	0.28	0.094
Intraoperative finding and comorbid factor	0.061	0.04	0.545

DISCUSSION

Bladder outlet obstruction in men was often found as BPH and its incidence was associated with the increase of age.⁴ It is similar with our study showing the most common patient's age was in the range 60-69 years (43%). Therefore, BPH is the most common bother some disease that decreases the quality of life in men. The formation of trabecula, diverticula, and bladder stone may associated with BPH. Obstruction in the urinary tract will increase intravesical pressure due to static urine. This prolonged obstruction will leads to bladder wall change, such as

smooth muscle thickening and collagen deposition. Smooth muscle function will be disturbed and leads to extruding sac formation.³ Smooth muscle hypertrophy and hyperplasia, increasing collagen deposition, increasing the type 1 and type 3 of collagen ratio, and muscarinic-cholinergic receptor commonly found in histology examination.^{3,7} Reduction in the intermediate cell bond leads to widening of the smooth muscle cavity. This explains the function weakness in the hypertrophy cells.^{3,4}

Detrusor contractility weakness and sac formation will form a urine puddle. This is the best environment for

bacterial growth and stone formation. Moreover, recurrent urinary tract infection will affect to the kidney and injured the bladder epithelium.⁸ Gadam *et al.*⁹ were found trabecula, diverticula, and bladder stones (15.4; 10.6 and 13.8%, respectively) in the 10-year experience with open prostatectomy in Nigeria. It is similar with Shakeri *et al.*² who did cystoscopy and cystography in BPH patients were found diverticula in 51-60 years patients, 61-70 years patients, 71-80 years patients, and over 80 years patients (23.1; 26.0; 28.0 and 36.4%, respectively). Trabecula, diverticula, and bladder stones were found in our study when the surgery had performed (28.7; 4.0 and 10.9%, respectively).

Surgery is recommended in the BPH treatment with urinary retention. Trans urethra resection of prostate has been known as gold standard replacing open prostatectomy.¹⁰ The complication of TURP are divided into 3 categories such as 1) intraoperative complication, 2) post-surgery complication, and 3) long-term complication.^{11,12} The most common complication are bleeding. It may associate with the size of the prostate, prostate edema, and time of resection. The TURP syndrome is characterized by loss of consciousness, respiratory distress, nausea, vomit, bradycardia, and visual disturbance. A large volume of the hypotonic irrigation that absorbed into vessels, due to sinus or vein perforation, may responsible for hyponatremia dilution.

The most common post-surgery complication is clot retention that obstructing urinary tract, so it needs to evacuate it.^{11,12} It is similar to our study, the most common surgery technique used is TURP (75%) with the complication are, chips or clot retention, TURP syndrome, bleeding, and urinary tract infection (56.4; 5.9; 2 and 1%, respectively). The risk factors of TURP complication are age and comorbid factors.^{13,14} Similar to this study, Uzun *et al.*¹⁴ reported that there was no

correlation between comorbid factors with bladder wall alteration. There was also no difference in the incidence of detrusor with age. This study did not find any statistical correlation between age and comorbid factor with post-surgery complication or intraoperative finding. It may due to the patients who had the comorbid factor in this study only 4.3%. However, prostate size and enlargement had been correlated with serum insulin and fasting plasma glucose. Insulin resistance has been expected to have a role in bladder smooth muscle thickness. It would increase the level of insulin-like growth factor 1 (IGF-1), then lead to hypertrophy of bladder wall muscle.¹⁵

A weak correlation between trabecula, diverticula, or bladder stones with post-surgery complications ($r=0.265$; $p<0.05$) was observed in this study. No studies concerning correlation between post surgery complication with bladder wall alteration or thickness were previously reported. However, Huang *et al.*¹⁶ reported that detrusor cell hypertrophy correlates with better TURP efficacy, where as Vincent¹⁷ reported that bladder explosion in TURP with diverticula is as a risk factor. It may due to the thin bladder wall mucosa and air bubble force that trapped in the sac. In this study, the bladder explosion was not found. Iscaife *et al.*¹⁸ reported that the diverticula size of the BPH patients is associated the incidence of acute urinary retention (best correlation with 5.15 cm, sensitivity of 73% and specificity of 72%. AUC = 0.75 ($p=0.01$). According to this study, it is recommended to perform the cystoscopy or cystography examination to find any bladder anomaly in BPH to reduce post-surgery complications.

This study was conducted at Bhayangkara Hospital Mataram, which often referred to national health insurance patient. The diversity of patient's place of birth or address in this study showed that this hospital is one of good health facility centre which

is limited in the city centre. The most common population in this city is farmers and in the lower-middle socioeconomic. This study is expected to be a reference to increase facility in developing countries. The limitation of this study is uneven of the intraoperative finding variable sample that could be a bias. This study did not reveal which is the most affecting intraoperative finding.

CONCLUSION

In conclusion, there is weak correlation between bladder wall alteration such as trabecula or diverticula with postsurgery complications in BPH patients. An early screening should be done to reduce the complication risk.

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